SOME NEMATODES FROM AUSTRALIAN HOSTS, TOGETHER WITH A NOTE ON RHABDITIS ALLGENI

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The nematodes examined for this report are recent additions to the helminth collection in the Zoology School of the University of Adelaide. They were, unless otherwise acknowledged, collected by the senior author. Included in the paper are references to some genera and species of Australian nematodes discussed recently by C. C. Kung (1948).

Types of the new species are being deposited in the South Australian Museum. We desire to acknowledge assistance in regard to material from Messrs. V. Haggard, Director of the Adelaide Zoological Gardens; G. G. Jaensch and L. Ellis of Tailem Bend; H. M. Cooper of the South Australian Museum; Bruce Shipway of the C.S.I.R.O., Western Australia; M. Blackburn, Fisheries Division, C.S.I.R.O.; as well as Dr. P. O. Flecker and Mr. J. Wyer of the North Queensland Naturalists' Club, Cairns.

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LIST OF HOSTS AND PARASITES

Fish

Aracana flavigaster (Gray). *Capillaria* sp., Glenelg, S. Aust.

Pagrosomus auratus Bloch. *Cucullanellus sheardi* J. and M., Outer Harbour, S. Aust.

Ophthalmolepis lineolatus C. and V. *Cucullanellus sheardi* J. and M., Kangaroo Island, S. Aust.

Lovettia sealii (Johnston). *Stomachus marinus* L., Tasmania.

Amphibia

Hyla peroni (Bibron) Tschudi. *Oswaldocruzia limnodynastes* Johnston and Simpson, Strathalbyn, S. Aust. *Physaloptera confusa* J. and M. (larval stage), Tailem Bend, S. Aust.

Limnodynastes tasmaniensis Gunther. *Physaloptera confusa* J. and M., larval stage, Tailem Bend, S. Aust.

Birds

Podiceps cristatus Linn. *Capillaria* sp.; and *Contracaecum podicipitis* n. sp., Tailem Bend, S. Aust.

Anas superciliosa Gmelin. *Tetrameres fissispina* (Dies.), Tailem Bend, S. Aust.

Mammals

Potorous tridactylus (apicalis) Kerr. *Austrostrongylus potoroo* n. sp.; and *Labiostrongylus eugenii* J. and M., King Island, Bass Strait, Tasmania.

Macropus tasmaniensis Le Souef. *Labiostrongylus longispicularis* Wood, Tasmania.

Macropus ocydromus Gould. *Dipetalonema roemeri* (Linst.), South-western Australia.

Macropus agilis Gould. *Labiostrongylus insularis* (J. and M.); *Cloacina digitata* J. and M.; and *Dipetalonema roemeri* (Linst.), all collected by Dr. P. Flecker from Brooklyn Station, Cairns district, North Queensland.

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Bos TAURUS L. *Onchocerca gibsoni* Cle. and Jnstn., North-eastern S. Aust.

RATTUS NORVEGICUS Erxl. *Trichosomoides crassicauda* Bellingham; *Capillaria hepatica* (Bancr.); *Protospirura muris* Gmelin; and *Syphacia obvelata* (Rud.), Adelaide, S. Aust.

RATTUS RATTUS Linn. *Capillaria hepatica* (Bancr.); *Protospirura muris* and *Syphacia obvelata* (Rud.), Adelaide, S. Aust.

MUS MUSCULUS Linn. *Aspicularis tetraptera* (Nitzsch); *Protospirura muris* (Gmel.); and *Capillaria hepatica* Bancr., Adelaide, S. Aust.

LEPUS CUNICULUS Linn. *Trichostrongylus retortaeformis* (Zed.); *Graphidium strigosum* (Duj.); and *Passalurus ambiguus* (Rud.), from various South Australian localities.

CAPILLARIA spp.

Collections of *Capillaria* spp. were made from two hosts. In both cases the data available were not sufficient to identify the species. As both are new host records for the genus, the available morphological points are noted below:

(1) *Capillaria* sp. from *Podiceps cristatus*, Tailem Bend. One male present, 10·1 mm. in length. Ratio between oesophageal and intestinal regions 1 : 1·12. Spicule 11 mm. long, sheath not spinose, but spirally striated. Sheath is extruded in the only specimen, and the bursa, if present, was not observed.

(2) *Capillaria* sp. from the cowfish, *Aracana flavigaster*, from Glenelg, S. Aust. Material consists of one whole male and one part, the length of the whole specimen being 6·1 mm., and the ratio of the anterior and posterior parts of the body being 1 : 0·85. The "bursa" consists of two small lobes posterior to the cloaca. The spicule is ·13 mm. long.

CAPILLARIA HEPATICA (Bancroft)

The characteristic lesions caused by this species, together with its eggs, have been found in *Rattus rattus*, *R. norvegicus*, and *Mus musculus* in the Adelaide district. The parasite had not been recorded previously as occurring in South Australia.

TRICHOSOMOIDES CRASSICAUDA (Bell)

This parasite was found in the bladder of laboratory-bred white rats, *Rattus norvegicus* var. in Adelaide. It has already been recorded by one of us from Eastern Australia.

Austrostrongylus potoroo n. sp. (fig. 1-5)

Numerous coiled reddish to colourless Trichostrongyle worms were taken from the intestine of a rat-kangaroo, *Potorous tridactylus* (*apicalis*), from King Island, Bass Strait. The animal was sent to us by the Adelaide Zoological Gardens. Both male and female worms are 3 to 3·4 mm. in length. The cervical cuticle is dilated and marked with annular striations, the rest of the body cuticle being smooth except for two narrow (lateral) and two wide (dorsal and ventral) longitudinal bands which are transversely striated. These bands become narrower and tend to disappear towards the end in both sexes. The buccal capsule is distinct, the eversible dorsal tooth occupying most of the cavity. Two very small ventral teeth are present. The oesophagus is about ·28 mm. long.

The spicules of the male are ·21-·25 mm. long. The gubernaculum is poorly chitinised. As it proved impossible to obtain a view of the bursa with the lobes spread open, the symmetry of this structure has not been established, but in lateral views right and left lobes appear similar. The form of the rays is shown in fig. 5.

The vulva of the female is ·24 mm. anterior to the tip of the tail. Behind this the body narrows rapidly to a finely pointed tail, ·15 mm. in length. The eggs in the vagina are 40μ by 70μ.

The species apparently differs from others of the genus in the form of the dorsal ray, which was constant in all the specimens examined, and in the more backward position of the vulva. The specific name proposed is the native name for this small marsupial.

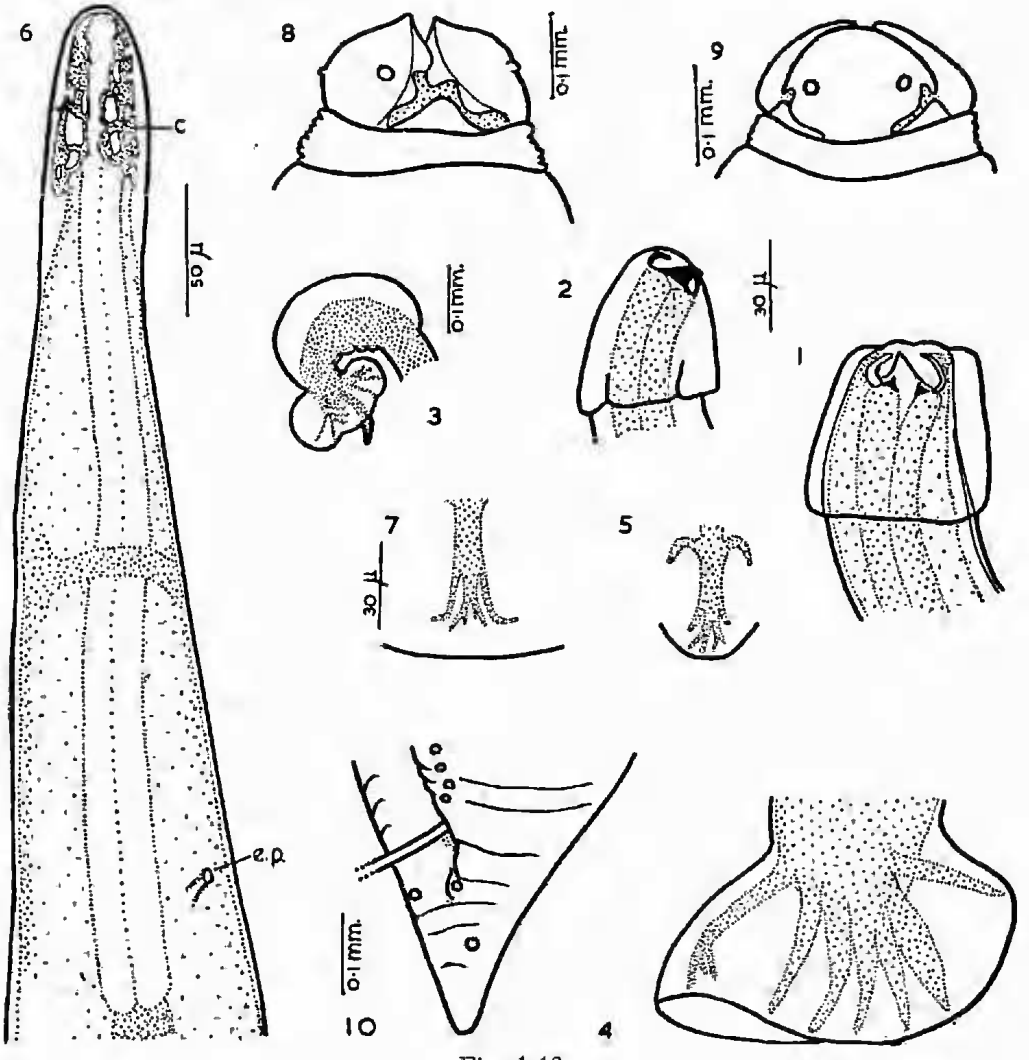

Fig. 1-10

Fig. 1-5, *Austrostrongylus potoroo*—1, anterior end; 2, anterior end with dorsal tooth protruding; 3, posterior end showing expanded cuticle; 4, lateral view of bursa; 5, dorsal ray. Fig. 6-7, *Oswaldocruzia limnodynastes*—6, anterior end; 7, dorsal ray. Fig. 8-10, *Contracaecum podicipitis*—8, and 9, sublateral and dorsal views of head; 10, male tail. Fig. 1 and 2 and 5 drawn to scale beside 2; fig. 4 and 6 to scale beside 6.

Oswaldocruzia limnodynastes Johnston and Simpson (fig. 6-7)

This species, originally recorded from *Limnodyastes dorsalis* from Adelaide, has now been recognised from *Hyla peroni* from Strathalbyn, collected by Miss L. M. Angel. The material consists of one female, one whole male and one broken male. These agree in general features with the original description, but

two minor variations have been noted; firstly the shape of the dorsal ray in which the terminal bifurcation occurs nearer the root, and secondly, chitinisation in the cephalic region. This latter is in the form of a dorsal and a ventral "porose" plate, lying in the inflated cuticle. The structure was seen only in the male specimen; the anterior end of the female is greatly contracted so that observation is in any case difficult. No mention of such chitinisation has been met with in the literature available, although it is probably a development of the "vesicular structure" noted by Morishita (1926, 14) in the inflated cervical cuticle of members of the genus. These two differences occurring as they do in only one specimen, are not considered sufficient evidence to indicate another species. Figures 6 and 7 illustrate these points.

TRICHOSTRONGYLUS RETORTAEFORMIS (Zeder)

Not uncommon in rabbits collected in the vicinity of Adelaide.

GRAPHIDIUM STRIGOSUM (Duj.)

Found occasionally in the stomach of South Australian rabbits.

The genus LABIOSTRONGYLUS Yorke and Maplestone

It has been suggested by Kung (1948, 105) that the genus *Labiostrongylus* Y. and M., 1926, was erroneously synonymised with *Zoniolaimus* Cobb by us (1939, 123). On re-examination of the evidence, we are in agreement with Kung's view.

LABIOSTRONGYLUS EUGENII (J. and M.)

From *Potorous tridactylus*, King Island. Numerous worms were found in the stomach of a rat-kangaroo which reached us by courtesy of the Director of the Adelaide Zoological Gardens. They agree generally with *L. eugenii*, differing slightly in the more forward position of the accessory lobes on the submedian lips.

LABIOSTRONGYLUS INSULARIS (J. and M.)

From the stomachs of the northern wallabies, *Macropus* (*Wallabia*) *agilis* from the Cairns district, North Queensland, collected by Dr. P. Flecker. Previously known only from *M. welsbyi* from Stradbroke Island, Southern Queensland.

CLOACINA DIGITATA J. and M.

From the stomach of *Macropus agilis*, Cairns district, North Queensland, collected by Dr. P. Flecker. Previously known from *M. dorsalis*, Burnett River, Queensland.

The genus ZONIOLAIMUS Cobb 1898

In a recent paper Kung (1948) suggested that three species placed by us under the genus *Buccostrongylus* J. and M. (1939, 140; 139a, 526-7) should be referred more correctly to *Zoniolaimus* Cobb. These species are *B. australis* *B. buccalis*, and *B. labiatus*, of which the first was cited by us as the type species of *Buccostrongylus*. We agree with Kung that the latter genus is therefore synonymous with *Zoniolaimus* Cobb. *Buccostrongylus setifer*, subsequently described by us (1939a, 527), from *Macropus ruficollis* becomes *Zoniolaimus setifer* (J. and M.), but as this name is preoccupied by *Z. setifera* Cobb 1898 (with which it is not conspecific) a new name, *Z. chaetophorus* is proposed for it.

ZONIOLAIMUS LONGISPICULARIS (Wood)

This stout nematode has been identified from material collected from the Forester kangaroo, *Macropus tasmanienus*, near Ross, Tasmania, and sent to us in 1947 by the Tasmanian Museum. We had previously reported it as

occurring in that State (J. and M., 1940, 469) but no locality was mentioned. The parasite is known to occur in wallabies or kangaroos in Queensland, New South Wales, Victoria, South Australia, Central Australia, North-western Australia and Tasmania (Johnston and Mawson 1938, 268-9).

Contracaecum podicipitis n. sp. (fig. 8-10)

A small collection of worms from a crested grebe, *Podiceps cristatus,* taken at Tailem Bend, was found to be referable to this large genus of nematodes.

Males and females up to 25 mm. in length were present. The head is shorter than wide. Each lip bears two lateral flanges; in the midlength of each flange is a well-defined indentation (fig. 8, 9). There are no denticles. The interlabia are very short. The oesophagus is 1:4·8 of the body length; the oesophageal appendix and intestinal caecum are 1:3 and 1:1·3 respectively of the length of the oesophagus.

In the male, the spicules are 3·1 mm. long, 1:6·5 of the body length. There are at least 34 pairs of preanal papillae, but only two small postanal pairs were seen (fig. 10).

The presence of very short interlabia is somewhat unusual in the genus *Contracaecum.* In the literature available to us the bird-parasitic species described as having this character are *C. ovale* (Linst.) from *Podiceps cristatus, C. praestriatum* Mönnig from *Podiceps capensis,* and *C. torquatum* Yamaguti from *Larus canus.* The present specimens differ from *C. torquatum* in the absence of labial denticles, and from *C. ovale* and *C. praestriatum* in the shape of the lips and in the greater length of the spicules.

CUCULLANELLUS SHEARDI J. and M.

This species appears to be common in fish in Australian waters (J. and M. 1944, 64; 1945, 116). It is now recorded from *Ophthalmolepis lineolatus* from Kangaroo Island and *Pagrosomus auratus* from Outer Harbour, both caught by H. M. Cooper.

TETRAMERES FISSISPINA (Diesing) (fig. 11-19)

Adult males and females and young worms, agreeing in most features with *Tetrameres fissispina,* were taken from the black duck, *Anas superciliosa,* at Tailem Bend. As this widely spread parasite has not previously been recorded from a native bird in Australia, a description of the present specimens is given here.

There are, as indicated in the more recent descriptions of the species, two trilobed lateral lips, not three lips as in older accounts. The buccal capsule is barrel-shaped in the female, more cylindrical in the male.

The females are from 1·7 mm. to 2·0 mm. in length, and from ·4 to 1·4 mm. in width, according to the number of eggs present. On the female there are no spines except the cervical papillae which are ·22 mm. from the anterior end and lie just in front of the nerve ring in a specimen 2 mm. long. The buccal capsule is 30μ long, and 23μ in internal diameter at its midlength. The tail, ·1 mm. long in a female 1·7 mm. in length, ends in a simple point. The vulva is ·2 mm. in front of the anus. Most of the smaller specimens have been damaged during collection, so the form of the reproductive organs has not been studied. The eggs measure 20μ by 30μ.

The males are from 2·8 to 4·2 mm. in length. Anteriorly the lateral alae may give the appearance of cordons as noted by Wehr (1933). The "long bifid spines" on each side mentioned by some authors (Seurat; Canavan) appear to be,

at stated by Wehr (1933) and Hsü (1935), modifications of the lateral alae which in this region are supported by rod-like cuticular thickenings (fig. 11).

The cervical papillae, 1·2 mm. behind the anterior end, are small but distinctly tricuspid, an observation not as far as we know recorded for *T. fissispina*.

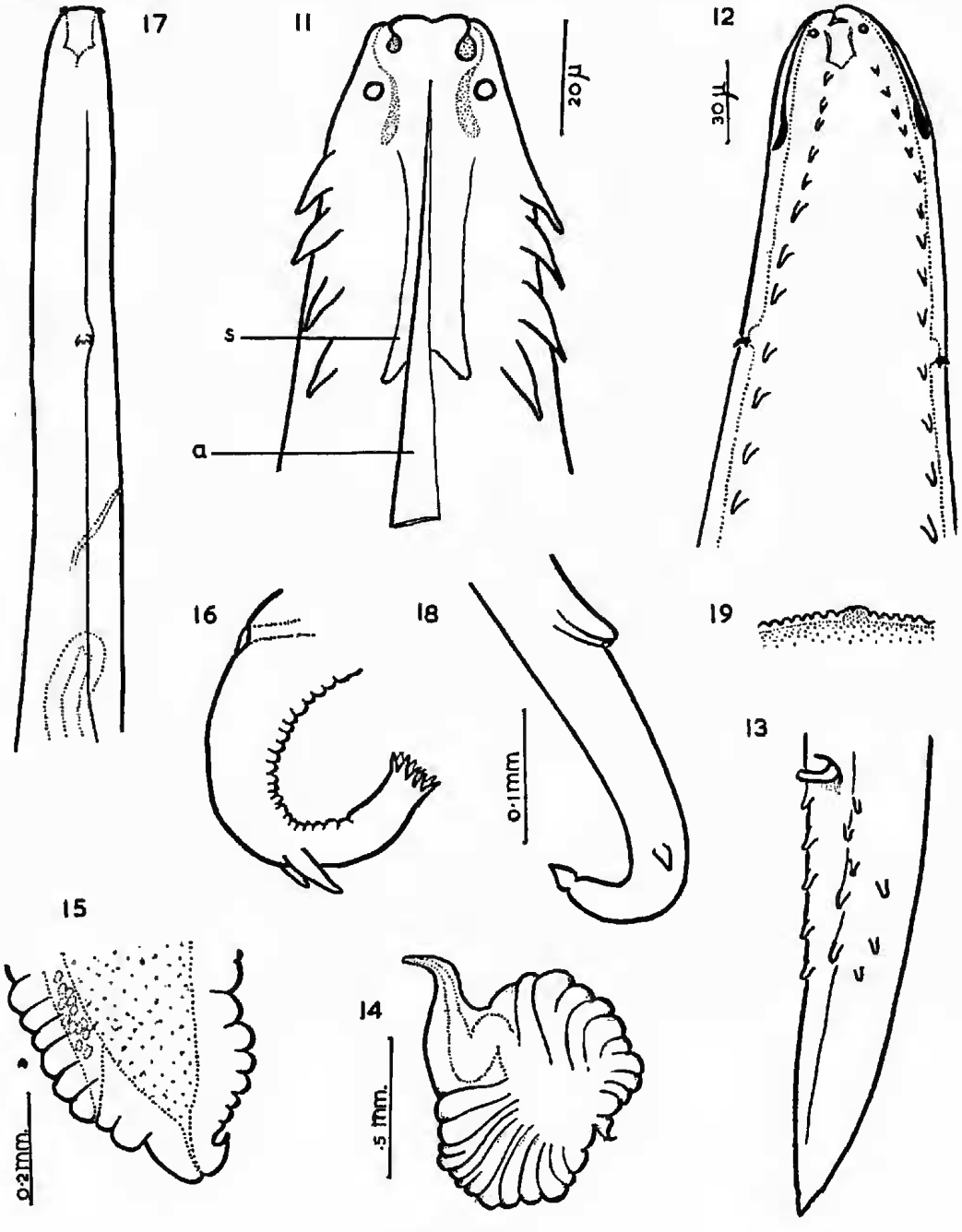

Fig. 11-19

Fig. 11-19, *Tetrameres fissispina*—11 and 12, lateral and ventral views of male; 13, male tail; 14, mature female; 15, tail of young adult female; 16, posterior end of fourth stage larva; 17, anterior end of young fifth stage; 18, posterior end of young fifth stage; 19, lateral ala of young fifth stage worm showing one of the asymmetrical "larval" papillae. Fig. 13, 16, 17, 18 and 19 drawn to scale beside 18.

Fig. 11-19

The body spines commence at the level of the posterior end of the vestibule and are arranged in four sublateral rows. These continue past the midlength of the body, and then become smaller and more sparse. The dorsolateral spines disappear in the hinder part of the body but the ventrolaterals become larger and more numerous, forming two rows of preanal papillae. Postanally there are five pairs of submedian and three pairs of lateral papillae (fig. 13). The tail ends in a small highly cuticularised point. The spicules are ·11 to ·15 mm. and ·3-·45 mm. in length respectively.

Several very young worms, in the early fifth stage, are present. They are from ·95 to 1·4 mm. in length. The cuticle is without annulations or spines except for the large trifid cervical papillae ·1 mm. from the head. The lateral alae are present, though very narrow, and extend from the head to the anus. The tail is ·12 mm. long, and a pair of elongate caudal papillae lie 70μ behind the anus. The tail ends in a pyriform "tail piece" (fig. 18), an exaggerated form of the caudal tip of the adult male. The vestibule is cylindrical, 10μ long and 8μ wide. The excretory pore is about 50μ behind the cervical papillae. As sometimes occurs in young worms, a pair of lateral papillae are present at about a third of the body length from the tail (fig. 19). Three fourth stage larvae are also present. These are easily distinguished from the fifth stage by the form of the caudal extremity which ends bluntly about 80μ behind the anus, the extremity being surrounded by about twelve large spines. The body length is 1·2-1·4 mm., the cervical papillae are hardly distinguishable, and the lateral alae scarcely developed. There is a pair of large caudal papillae, 70μ from the posterior end of the body, that is, in a similar position to those in the young fifth stage, but very much larger. We have referred to these two stages as fifth and fourth respectively, rather than fourth and third, since they were found in the intestine of the definitive host.

Onchocerca gibsoni Cleland and Johnston

Mr. L. Reese, of Miranda Station in the far north-eastern portion of South Australia and adjacent to the Queensland border, informed the senior author that this "nodule worm" parasite occurred in the brisket of locally bred cattle. This is the first record of the occurrence of the parasite in this State, apart from infections in Abattoirs cattle from Queensland.

Physaloptera confusa J. and M.

The larval stage, enclosed in its typical heavily pigmented black cyst has been found in *Limnodynastes tasmaniensis* and *Hyla peroni* from Tailem Bend, South Australia.

Protospirura muris (Gmelin)

From *Rattus norvegicus*, *R. rattus* and *Mus musculus* in the vicinity of Adelaide. Already reported by one of us as occurring in these hosts in Eastern Australia.

Dipetalonema roemeri (Linst.)

Mr. Bruce Shipway, of the C.S.I.R.O. in Perth, forwarded specimens of this Filariid species from kangaroos, *Macropus ocydromus*, from the south-western region of Western Australia. This grey kangaroo is closely related to *M. major*, which has a very wide distribution in Australia. Mr. Shipway reported finding it in about 60% of the Western Australian kangaroos examined by him. We redescribed it in 1938 (1938, 111-112). We now record it also from *Macropus agilis*, from Brooklyn, Cairns district, North Queensland, collected by Dr. P. Flecker.

Syphacia obvelata (Rud.)

From *Rattus rattus* and *R. norvegicus* from the vicinity of Adelaide. Previously recorded from these host species elsewhere in Australia.

Aspiculuris tetraptera (Nitzsch)

Found occasionally in mice in Adelaide.

Passalurus ambiguus (Rud.)

This oxyurid is seen occasionally in South Australian rabbits. It has not been recorded previously as occurring in this State.

Stomachus marinus (Linn.)

This larval anisakid has been recorded from several Australian marine fish. We now report it from the Tasmanian Whitebait, *Lovettia sealii*, from the Derwent River, the material having been submitted by Mr. Maurice Blackburn of the Fisheries Division of the C.S.I.R.O.

A Note on Rhabditis allgeni Johnston

In 1893 Cobb described *R. australis* from grass roots in New South Wales. Allgen (1932, 192) used the same name for a different nematode from Campbell Island (Subantarctic). Johnston (1938, 151) renamed the latter *R. allgeni*. Allgen, apparently unaware of Johnston's action, has proposed recently (1948) a new name, *R. campbelli*, for his species. *R. campbelli* is thus a synonym of *R. allgeni*, of which *R. australis* Allgen 1938 nec Cobb 1893 is also a synonym.

SUMMARY

1. Known species of nematodes are recorded from additional hosts and localities.
2. *Austrostrongylus potoroo* from a marsupial, *Potorous tridactylus*, from King Island, Bass Strait; and *Contracaecum podicipitis* from the crested grebe, *Podiceps cristatus*, from South Australia, are described as new.
3. *Zoniolaimus setifer* (Johnston and Mawson 1940) nec Cobb 1898 is renamed *Z. chaetophorus*.
4. *Tetrameres fissispina* (Dies.) is described from an Australian duck, *Anas superciliosa*.
5. The free living nematode species, *Rhabditis campbelli* Allgen, from Campbell Island, is a synonym of *R. allgeni* Johnston.

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